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studied by Dr. H. Rabl-Rückhard, of the Berlin Museum, with a view (1) to determine the cephalic ending of the notochord in its relations towards the hypophysis cerebri and the so-called middle trabecula, and (2) the origin of the pineal gland. He finds that at no period has the embryo of Acanthias a notochord with its apex projecting beyond that part of the base of the skull, which subsequently becomes the dorsum sellæ, thus confirming the views of W. Müller, Balfour and Parker; though this view is not irreconcilable with the view of Reichert, that the notochord of young sharks at a certain period of development reaches to the frontal wall. ——As regards the comparison of the brains of the higher vertebrates with the lower, which is in controversy, by ascertaining the true position of the pineal gland, we advance towards a true solution of the difficulty. Rabl-Rückhard confirms the views of Balfour and Ehlers that in sharks this gland is developed just as in higher vertebrates, as Stieda insists, in all higher adult vertebrates it lies dorsally between structures which correspond to the primary first and second cerebral vesicles.——Professor His, studying the question as to the development of a tail in the human embryo, disputes that it has at first a true tail, as it possesses no supernumerary vertebræ, and in pathology no extra number have ever occurred.

ENTOMOLOGY.[1]

EXUVIATION IN FLIGHT.—Mr. R. McLachlan has recorded a remarkably numerous flight of the Ephemerid, *Oligoneura rhenana*, last August, at Basle, Switzerland, with the interesting observation that it casts the subimaginal skin while on the wing. We have often met with just such swarms of Ephemerids as Mr. McLachlan describes, flying either against the wind or against the current of a river. In the case of *Polymitarcys alba* (Say), which is extremely common on the Red river of the north, where in August, 1877, we found it actually giving the river a white appearance, and falling upon vessels like snow, the subimaginal skin was shed in an incredibly short space of time (less than a minute), but was almost invariably preceded by a brief period of rest. The impatience to fly off after the true wings were withdrawn, however, was such that in the large majority of cases the insect took wing before the subimaginal skin was fully cast, in which case exuviation would be completed on the wing. We cannot conceive of the beginning of the process taking place on the wing, for there is a period, however short, from the bursting of the skin on the thorax to the extraction of the wings from their covering, when the use of the wing, it seems to us, is impossible; and we can conceive of full exuviation in the air only on the hypothesis that the insect during the process descends from a sufficient altitude to afford time for the extraction of the new wings.

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[1] This department is edited by PROF. C. V. RILEY, Washington, D. C., to whom communications, books for notice, etc., should be sent.

On Some New Tube-constructing Spiders.—While wandering on a bright October day in search of spiders, over the hills on the Virginian shore of the Potomac, near the Aqueduct bridge, I noticed on a grassy place at the border of a pine wood, several small, nest-like structures with a round hole in the center, and was at once aware that I had at last before me the so-long looked for home of a certain ground spider or Lycosa.

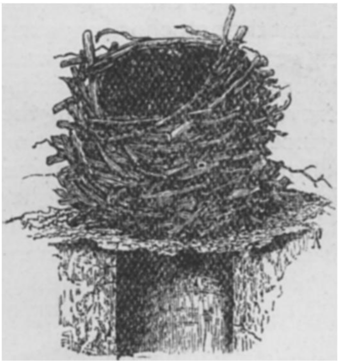
Fig. 1.—Nest of *Tarentula nidifex* (Marx del.).

These little nests were about 2 cm. high, composed of bits of grass, little sticks of wood, pine leaves and rootlets, perfectly round and made in very much the same way as an ordinary bird's nest, and of much the same form (Fig. 1). The nest inside was cylindrical and about 2 cm. in diameter.

Removing carefully the little nest, I dug open the shaft and found it to be in some instances 10, in others 12 cm. deep, perfectly round, smooth, perpendicular and without any web lining. But the nest was strengthened inside by a lining, which resembled a very fine tissue paper, so fine that it could hardly be noticed. Under the lens it showed no threads but a more hardened texture, like varnish. This lining holds together the loosely arranged material and enables it to resist rainstorms, floods, snow and all dangers of a stormy winter, for I found several pretty well preserved ones in spring.

At the bottom of this shaft there laid in an unconscious or torpid condition, a large dark-brown spider (Fig. 2) in a semi-erect position. Pulling the spider out with my forceps, it awoke, made some movements and laid down again. I found five additional specimens, and the nests, as well as the shafts, were all constructed on the same plan. In only one instance did I find the bottom part somewhat enlarged.

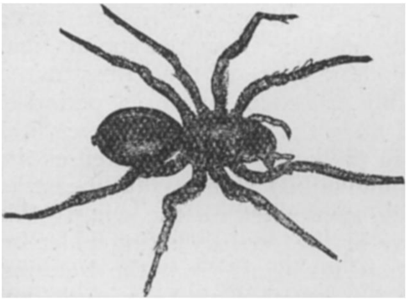
Fig. 2.—*Tarentula nidifex* ♀ (Marx del.).

Not far away from the place where the above nests occurred, but upon a barren clay ravine, where the rain had washed away all vegetation, I found an apparently newly built structure, which differed from the former ones in the kind of the material used for its construction, for it was built of clay, little stones and few and stronger wooden sticks (Fig. 3). On one side a little colony of lichens was flourishing.

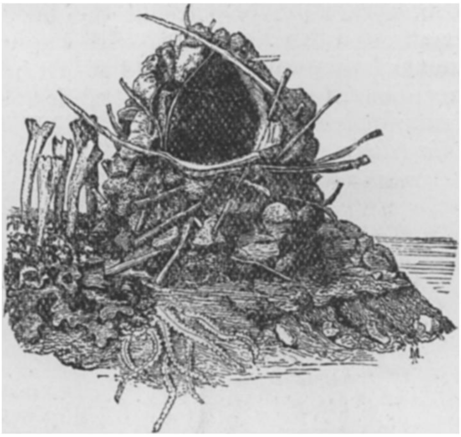

FIG. 3.—Nest of *Tarentula nidifex* (Marx del.).

In this shaft, which was wider than the others, I found a very large specimen of the same species. Handling it somewhat carelessly, it awoke, and turning quick around, caught my finger and bit it with such force, that it clung on my raised hand. The pain was intense and about as acute as that from the sting of a wasp, but it disappeared in twenty minutes, while the swelling of the finger and of half the hand, lasted over two hours.

I brought the spider home and filled a high glass jar three-fourths full of earth, and put the spider in its new home. It laid motionless on the ground, and I thought it was dead, but the next morning I found that it had dug, during the night, a hole 5 mm. deep, which it occupied. The following nights it deepened the shaft more and more until the depth was 12 cm. I strewed little sticks of broomcorn over the ground, and during the night it had placed a few sticks around the hole. Every morning it had added a few sticks, and at the end of the week the nest was complete, measuring 3.5 cm. in height. All her work was performed during the night, and in day time she occupied her new habitation. As it was too early in the season for flies, the poor creature had to fast for three months, during which time she kept herself confined in the shaft. Only when I placed the jar near the stove and the contents got warm, did the spider appear on the top of the nest and rest there, with legs bent under like a cat in the sunshine.

In March I caught the first fly, which was devoured in an instant by the spider outside the habitation. I then fed her regularly with flies, and she would jump up after them. Did the fly come near her she stood erect upon her four posterior legs, and with the four anterior and her palpi, she made rapid sweeping motions towards her mouth, and she got the fly always. One day I placed a watch glass full of water on the ground, and the spider at once made use of it by placing her palpi and front feet in the miniature basin, and then drawing them through her mandibles several times. At last she waded into the basin, where she lay for a quarter of an hour, the whole body except the head being under water. One morning, May 26, I found her dead in the water. The specie seems to be new, and I have called it in MS. *Tarentula nidifex.*

About the same time I received from Mr. Nicolas Pike, of Brooklyn, with whom I had corresponded upon this subject, specimens, in a dried state, of a Lycosa which, according to a statement of this eminent naturalist, digs similar holes in the sand near the sea shore. Mr. Pike speaks thus about the habits of this remarkable spider, to which I have given the MS. name of *Tarentula pikei:*

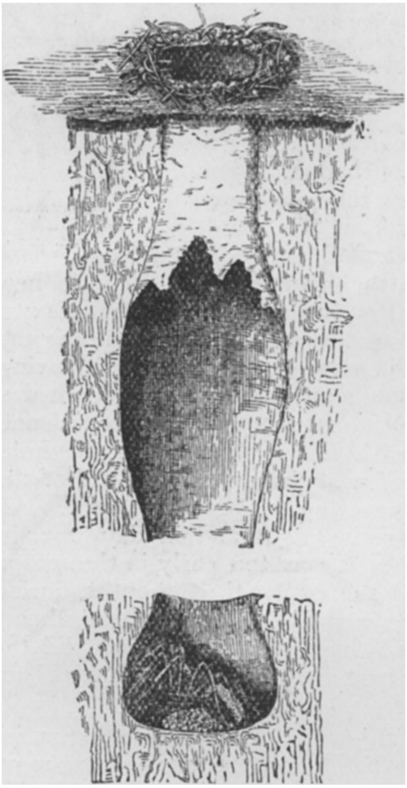

FIG. 4.—Nest of *Tarentula pikei* (Marx del.)

> It makes a hole in the sand from 12 to 15 inches deep (in one instance I found it 22 to 23 inches), perfectly perpendicular, and the depth and diameter vary according to the size and age of the individual. The entrance to the habitation is neatly underwoven with a fine web and particles of sand, which extend down more than an inch from the entrance, where the excavation widens so as to enable the spider to turn more rapidly and retire to the bottom with its prey. The lower part is also enlarged, and is covered as well as the whole length of the tube, with a substance which the spider secretes and which forms a hard, smooth finish to the interior, so that when it runs in and out of the tube not a particle of sand is displaced.
>
> The entrance to the excavation, when inhabited by adults and built on an elevated sand dune, is very neatly thatched with pieces of fiber and the fine grass which abounds on the seashore (see Fig. 4). This thatched entrance is ingeniously constructed, and sometimes, not always, interwoven with a fine web, which prevents the loose sand from falling into the hole.
>
> It was some time before I could ascertain the manner in which these spiders construct their curious habitations, as the work is always carried on at night. At last my perseverance was rewarded.
>
> In the summer of 1877 I passed some time at Shinnicook and its vicinity (Long Island). While encamping in a very remote and out of the way place, amongst the sand dunes, where these spiders are numerous, I there had the good fortune to see the operation of building as well as to study the habits of this probably hitherto undescribed spider. In this case a female was the operator. She commenced by removing the sand on the surface till a saucer-shaped excavation was made, about a quarter of an inch deep. This was done by pushing away the sand with her body, and then she commenced to make the excavation proper, with a peculiar rotary movement of her body. The sand was pushed back and a glutinous web was spun, which held back the particles of sand, she at the same time pressing it with her abdomen to the size required until the opening was completed. I could still observe her at work as she constructed the upper chamber (if I may call it so), which occupied much time. After this was finished, I lost sight of her, as the excavation in the damp sand was raised. My obser-

vations were made by the dim light of a lantern, as the night was dark and cloudy. It was midnight when I left her and laid down in my rubber blanket, and at dawn the next morning the nest was finished. She had completed it by a thatched ring one and a half inch in diameter. I reluctantly destroyed the nest, but was anxious to examine all its parts. I first tried to get the spider out by inserting a straw, but she would not move. I then carefully removed the thatch and web for preservation, and then dug down to ascertain the depth and structure of the excavation. I found it to be 21½ inches deep, perfectly straight down, and the upper and lower chambers were just twice the size of the main tube, which in this case was seven-tenths of an inch in diameter. There was not a vestige of web, except in the two chambers, as the sand was damp and adhesive.

In the month of June I have found the female on her eggs at the bottom of the tube; these were loosely covered with web and agglutinated sand, similar to the egg bag of the *Lycosa maritima* Hentz. She seldom leaves her eggs, but remains with them till they are hatched, when the young cling to her body till they are about three-eighths of an inch long.

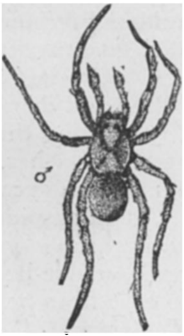

FIG. 5.—*Tarentula pikei* ♂ (Marx del.).

Fig. 5 represents the male, and Fig. 6 the female of this interesting species.

Mr. S. H. Scudder has published in *Psyche* (January, 1877) an account of a tube-constructing ground-spider which dwells in the sandy spots and dunes of Nantucket, and which he calls *Lycosa arenicola.* While the habits differ from those of *Tarentula pikei* (for instance, the shaft is without the widenings in the upper half and at the bottom) and the two species differ in some respect in form and color, they certainly belong to the same genus and are nearly related.

Another mention is made of a spider which makes similar habitations, by that gifted observer, Mrs. M. Treat, of Vineland, N. J., who in *Harper's Monthly* (April, 1880) describes at length its habits, and names the species *Lycosa turricola.*[1]

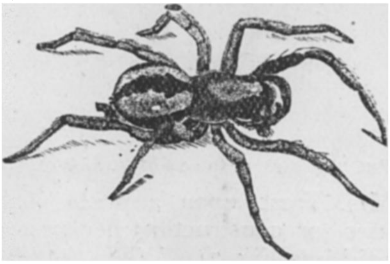

FIG. 6.—*Tarentula pikei* ♀ (Marx del.).

In conclusion I will state a few facts about the habits of the spider *(T. nidifex)* which I have found, in which it differs from the other three species here mentioned, viz: *T. pikei*, *L. turricola* and *L. arenicola.*

While the discoverers of these three species are unanimous in stating that they have found egg-bags at the bottom of the tubes, I have never found any egg-bag, although I have opened more than twenty tubes in spring and summer. Nor have I noticed any indication that the spider uses this subterranean structure as a home during the time she has to care for her eggs or young ones. On the contrary, I am convinced, for the following reasons, that this species (*Nidifex*) uses this structure only as a safe and secure winter quarter, and that during the warm spring, summer and early autumn months she lives on the surface:

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[1] See also an article "The Lycosa at Home," by J. H. Emerton, in the NATURALIST, Vol. IV, p. 664.—EDITORS NATURALIST.

1. Only during the latter part of October and fore part of November, have I found the newly built nest and chimney-like structures.
2. I always found then, in each shaft, one spider in its winter sleep.
3. In May the structures above ground were, if still existing, in a dilapidated condition, and the shafts unoccupied.
4. In June, July and August, I have never found a single spider "at home," the above ground buildings were in the same unrepaired and dilapidated state.
5. During these months I have found by sweeping the grass and low bushes, three specimens of the spider, and one in an old stump of a sycamore, where she had constructed a web.

As this spider lives in a cultivated place, *i. e.*, grass bottom with shrubbery and trees in abundance near by, she finds her prey outside her shaft, and at the same time, ample opportunity to hide from her enemies under moss, leaves or stones, etc., while *T. pikei* and *L. arenicola*, living without any shelter on the barren sand dunes, are compelled, for safety sake to occupy their under-ground habitations permanently.

Lycosa turricola builds her nest, according to the statement of Mrs. Treat, upon a pentagonal plan. Now *Tarentula nidifex* uses for constructing her nest a displaced quadrangle or rhomboid (see Fig. 7). When the material for the nest consists of soft and flexible grass blades, the spider bends them round the hole half way (see Fig. 8), but if she uses coarser sticks, she lays them always as is shown in Fig. 7, but if she finds a piece naturally bent, she makes use of the curve by laying it so that the concave side is brought around the hole.—*Geo. Marx, Washington, D. C.*

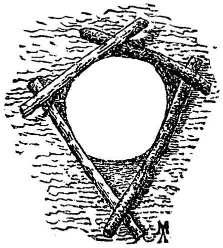
FIG. 7—Entrance to nest of *T. nidifex.*

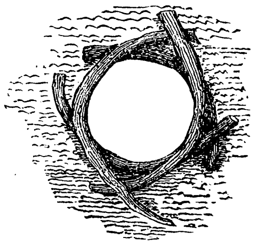
FIG. 8.—Entrance to nest of *T. nidifex.*

THE RASCAL LEAF-CRUMPLER IN GEORGIA.—We have received from Mr. J. P. Henderson, Commissioner of Agriculture of Georgia, specimens of this insect (*Acrobasis nebulo* Walsh) reported as doing great injury to the orchards of Mr. James Speir, in Bryan Co., of that State, webbing together the leaves and eating out the buds as they put forth in the spring. Its injuries in the Western States have long been well known, but its appearance in the South has not been so generally recorded.

VERTICAL VS. HORIZONTAL INSECT BOXES.—A. Preudhomme de Borre has published a pamphlet on the " Best arrangement of boxes and cartons of collections of insects." While admitting that as far as space and convenience are concerned, the arrangement of boxes on their edges is advantageous, he claims that for the following reasons it is unwise, viz: (1) Specimens become loose and fall, breaking themselves and their neighbors; (2) or they turn on their pins with similar results; (3) infected specimens are not readily detected by the dust.

Dr. G. H. Horn, of Philadelphia, claims that the objections urged by M. de Borre are due, in a great measure, to the improper boxes used for preserving specimens in France and Belgium, and makes the following arguments against de Borre's objections:

1. The French boxes are made of thick pasteboard, having false bottoms made of *papier maché*, or peat, very rarely of cork. The paste-board is objectionable from the fact of its tendency to lose its shape and become convex, while the peat and *papier maché*, on account of their inelasticity, are unsuitable, the former having the additional bad quality of corroding and adhering to the pins.

2. The danger of the specimens becoming loose may be averted by using shorter pins than the French are accustomed to, and the bottom of the box should be invariably lined with cork of at least one-fourth of an inch in thickness. To prevent the specimen from turning on the pin, dip the pin previously into an alcoholic solution of shellac. In the case of large specimens, slightly flatten the pin by a few blows with a hammer, in addition to coating it with shellac.

3. The presence of infection is readily detected in a vertical box as the dust always falls on the head of the specimen below the infected one.

4. The box for the preservation of specimens should be made of well seasoned pine, nine by fourteen inches and two inches deep, all outside measure. The lining of the bottom should be cork of one-fourth of an inch in thickness, covered with thin glazed paper. In such boxes, specimens may be arranged in the following manner: draw faint pencil lines from one side of the box to the other, dividing it into five or six equal portions, according to the size of the specimens, then beginning at the upper left corner of the box, place four specimens side by side, and so on down that column, and then the other divisions in succession.

INSECTS AFFECTING THE CHINA TREE.—The China tree (*Melia azedarach*) has always been considered as perfectly free from any insect attacks whatever. No caterpillar of any kind has ever been found feeding on its foliage; no Buprestid or Scolytid beetles bore in its trunk or branches, and no gall-insects disfigure its leaves or twigs. This tree, with its beautiful dense foliage, is, in fact, to be highly recommended as a shade tree in the South, and especially in those cities which are so badly infested with the

Bag-worm *(Thyridopteryx ephemeræformis)*. This immunity enjoyed by the China tree from the attacks of insects, is not perfect, however, as we have recently received from Alabama some twigs and leaves infested with the scales of a Coccid belonging to the genus Lecanium; but what is more interesting, the twigs are covered with the waxy scales of a Ceroplastes of really beautiful appearance and new to science. The leaf-cutting ant *(Atta fervens)* shows a decided partiality for the leaves of this tree in Texas.

GALLS ON EUCALYPTUS.—Mr. R. McLachlan has recently described two very interesting galls occurring on *Eucalyptus gracilis* in Australia; the one a curious modification of a flower bud and possibly Cecidomyidous, the other occurring on the leaf-stem and looking like a capsule with three or four long arms, and supposed to be Lepidopterous. We know of no Lepidopterous galls that take on any such specialized characters as the last named, figured by Mr. McLachlan, the galls made by this Order of insects being almost invariably mere swellings of a stem, a fact which would indicate that the Lepidopterous larva which Mr. McLachlan found in this Eucalyptus gall might be inquilinous.

NORTH AMERICAN ANTHOMYIADÆ.—Dr. Hagen publishes in the March number of the *Canadian Entomologist*, a list of the North American species of this family of flies, contained in the Cambridge Museum, and which have been examined by Mr. R. H. Meade of England. In Osten Sacken's Catalogue there are 139 species given, including a number of Mr. Walker's, which seem not to have been yet identified. Mr. Meade makes out 121 species, and Dr. Hagen states that Loew's collection contains 12 not seen by Mr. Meade, so that the whole number of North American species, represented in the Cambridge Museum, is 133, of which 34 seem to be identical with European species. The *Anthomyia angustifrons* Meig., of the First Report of the United States Entomological Commission, which so commonly infests, in the larva state, the egg masses of *Caloptenus spretus*, is referred here as in Osten Sacken's catalogue to the genus *Chortophila* Macq.

GALLS AND GALL-INSECTS.—We are pleased to see, that after some years of intermission, Mr. H. F. Bassett, of Waterbury, Conn., continues his descriptions of North American Cynipidæ. He describes in the above-named journal, several Californian species, among others *C. q. californica*, which attains the largest size, with perhaps one exception, of any hitherto known North American gall. The flies produced from it are all females, but the gall is interesting to the Coleopterist because it nourishes *Ozognathus cornutus* Lec., a beetle very curious from the fact that the male has a long, erect horn on the base of each mandible, the horns nearly meeting at their incurved tips. Mr. Bassett describes his galls from specimens collected in 1878 and 1880, at Red Wood city, California, upon what he considers, with a question, *Quercus hindsii*. Our first specimens of this gall were received some ten years ago from Sonoma county, the oak not being determined, but we subsequently received specimens from San Mateo, Cal., from Dr. L. D. Morse, who is quite a good botanist, and who determined the oak as *Quercus douglasii*. We exhibited specimens of the gall to Mr. Bassett in 1871, and also presented some to Mr. Albert Müller, of Basle (then of England), who refers to it under our MSS. name of *Quercus-californica* in the Proceedings of the London Entomological Society for 1872, p. 32.

Aside from the various parasites which prey upon the Cynips, we have always found these galls to be infested with the beetle[1] above mentioned. Mr. Müller gives an account of his observations on the habits of this insect, showing that it agrees therein with *Anobium*. We would further remark that the beetle breeds in the dry galls and still continues its work in galls that have been in our cabinet over five years.

ANTHROPOLOGY.[2]

THE PEOPLE OF ALASKA.—A very important document to the ethnologist is the preliminary report of Mr. Ivan Petroff to General Walker, upon the Population and Resources of Alaska, forming executive document No. 40, 46th Congress, 3d Session. The author was sent out by General Walker last year for this special service, for which he is peculiarly fitted by his thorough knowledge of both Russian and English. In the prosecution of his labors he traveled 4500 miles by steamer, 2500 by canoe, 1700 by sailing vessel; a total distance of 8700 miles. Our entire Alaskan country as far north as the Yukon was examined, and tabulated reports are given, village by village, of the inhabitants. The people of the Territory may be divided as follows: 1. The Innuit or Eskimo race, which predominates in numbers and covers the littoral margin of all Alaska, from the British boundary on the Arctic to Norton sound, of the Lower Yukon and Kuskokvim, Bristol bay, the Alaskan peninsula, and Kodiak island, mixing in, also, at Prince William sound. 2. The Indians proper, spread over the vast interior in the north, reaching down to the seaboard at Cook's inlet and the mouth of Copper river, and lining the coast from Mount Saint Elias southward to the boundary, and peopling Alexander Archipelago. 3. Least in numbers but first in importance, the Aleutian race, extending from the Shumagin islands westward to Atto—the *ultima Thule* of this country. The grand total of population is: whites, 392; Creoles, 1683; Aleuts, 2214; Innuits of Kodiak, 2196, of Togiak, 1826, of Bristol bay 2099, of Kuskokvim, 3505, of Yukon, 3359, of Behring sea, 1533, of the

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[1] *Anobium cornutum* Lec., Proc. Phila. Acad., 1859, p. 87. Subsequently made the type of a new genus, *Ozognathus*, ibid., 1865, p. 226.

[2] Edited by Prof. OTIS T. MASON, Columbian College, Washington, D. C.